California Public Employees' Retirement System

Final Actuarial Audit Report

Report Completed In Satisfaction of
Task 7a of Contract 2003-3236

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Executive Summary

Under Task 7a of Amendment No. 2 of Contract 2003-3236 (the Contract), EFI Actuaries is charged with preparing a Final Actuarial Audit Report (the Report) for the period of the Contract, which runs from November 1, 2003 through November 30, 2008. The purpose of this Report is to fulfill that requirement.

The bulk of this Report summarizes the results of our audits during the five-year period of the Contract. In this Summary, we make some general comments on the changes at CalPERS during the contract and the challenges likely in the future.

Over the term of this contract, the Actuarial Office at CalPERS has continued to grow and improve. At this point it resembles an excellent actuarial consulting firm much more closely than a government office. Ron Seeling and his staff are to be commended for this achievement. A short list of the accomplishments of the Actuarial Office would include a more educated and informed CalPERS Board and staff, better and more extensive outreach to CalPERS participating employers, and changes in actuarial funding methodology designed to reduce the unpredictability of employer contribution rates.

As a result of these improvements, we are now able to dig deeper into the valuations performed by the Actuarial Office. As can be seen in the body of this Report, the issues we have uncovered in auditing the staff actuarial valuations have become more minor, even pedantic, including such issues as the difference between member and spouse ages (Legislators' Retirement System) or assuming member growth in amortization calculations (Judges' Retirement System and Judges' Retirement System II). While this makes the audit reports more detailed and technical, it also means that the major issues are correct. That is very good news.

The writing is already on the wall concerning the future challenges to be faced by CalPERS. Barring a miraculous recovery, the precipitous decline in the value of nearly all classes of investments will impact pension funding ratios and costs severely. Even with the smoothing methods in place, CalPERS participating employers can expect significant increases in their pension contributions over the next few years, exactly when their tax revenues from all sources are declining.

Consequently, the CalPERS Board is likely to receive pleas for rate relief or reduction from many sources, including the State and participating employers. Difficult policy issues will emerge. In this situation it is vital that the actuarial and investment processes retain their integrity. Actuarial assumptions should continue to be based on solid evidence and good judgment, not on a desired result. Actuarial valuations should continue to present best estimates of liabilities and costs, even if these figures are troubling and difficult.

If CalPERS maintains its independence and integrity during these difficult times, it will continue to survive and thrive. We look forward to being your partners in that endeavor.

EFI

Background

Under Task 7a of Amendment No. 2 of Contract 2003-3236 (the Contract), EFI Actuaries is charged with preparing a Final Actuarial Audit Report (the Report) for the period of the Contract, which runs from November 1, 2003 through November 30, 2008. The Contract language dealing with the Report is as follows:

> Contractor will prepare a Final Actuarial Audit Report for the contract period. The report shall contain at a minimum: a recap of issues found during each actuarial review, how issues were resolved, and what issues remain outstanding. This report also provides the contractor an opportunity to comment on the overall status of the actuarial process at CalPERS for items such as funding status, actuarial assumptions and member data.

In this Report we will make some general comments, then follow the outline contained in the Contract language, reviewing the issues that have arisen during the Contract term and their resolutions.

In general, the work produced by the Actuarial Office currently attains a high professional standard, and it continues to improve. During the term of the Contract, the actuarial valuations of the State, Schools, and public agency plans were of consistently high quality, as were the valuations of the Judges', Legislators', and Volunteer Firefighters' plans.

This Report concerns itself with the computation of liabilities and costs relying on the available member data; prior reports prepared by EFI Actuaries have had the same focus. Based on the project parameters specified by the Board and staff, the issue of the accuracy of the underlying member data has been and continues to be excluded from our analysis.

Methodology

For each of the plans under the scope of the Contract, we performed parallel valuations. These parallel valuations and certifications involved three steps:

- Review of Methods and Assumptions

  The actuarial assumptions and methods employed in the actuarial valuations were reviewed by EFI in order to establish whether they met acceptable standards of actuarial practice.

- Independent Parallel Valuation

  In order to verify the correctness of calculations in the valuations, EFI conducted a number of independent, parallel valuations using its own actuarial models. These independent valuations determined whether actuarial assumptions and methods are applied properly and yield the reported results.

  In preparing our parallel valuations, we relied on member and asset data supplied by CalPERS' staff. As is usual in actuarial valuations, this data was neither audited nor independently verified.

- Reconciliation of Results

  In the event that the costs computed by EFI differed by more than 5% from those computed by CalPERS' staff, reconciliations were required. This reconciliation proceeded in three steps:

  1. Establishing that the same member data has been used by EFI and by staff;

  2. Researching methodological differences between the EFI and staff approaches to computing liabilities and costs; and

  3. Comparing test life results to uncover subtle differences in approach that may result in material differences in liabilities and costs.

In the past, EFI used the EFI Visualization and Animation (V&A) Actuarial Model in its parallel valuations. However, for this Contract EFI developed enhanced valuation systems for our actuarial audits of the CalPERS public agency and State & Schools valuations. These valuation systems have no components in common with V&A, and operate on completely different principles.

There were a couple of reasons EFI took this step.

1. A Different Perspective

   An actuarial valuation system may be regarded as a kind of language for modeling a pension plan. In the case of human languages, some concepts are easier to express and deal with in one

language than in another. In the case of actuarial valuation systems, benefit provisions that are easily and naturally handled in one system may require approximations in another.

As this issue applies to an actuarial audit, errors and other issues that are easily uncovered by a parallel valuation in one system may be extremely difficult to detect under another. Therefore, changing the valuation system allows us to review the CalPERS staff valuations in a new way, focusing on new issues and different types of potential error.

2. Strengthening the Audit Process

Developing and deploying a new valuation system forced EFI staff to approach the certification process from scratch. New actuarial models had to be developed, tested, and used in our audit effort. All aspects of the audit were reexamined.

In a real sense, by changing its systems, EFI has changed the auditor on the Board's behalf. While EFI staff has not changed – retaining the knowledge and experience of that staff – the software and supporting systems have been replaced, forcing a new approach to the audit. Therefore, without the disadvantage of losing the experience and knowledge of the current auditor, the traditional advantages of changing the auditing firm have been realized.

There are a number of differences between the V&A Actuarial Model and the new EFI model used in this Report.

1. Handling of Active Member Service

V&A made no distinction between eligibility and benefit service, while the new model handles each separately. There is no significant difference for most plans. In those cases where there is a significant amount of CalPERS system service outside of the Plan, enabling earlier benefit eligibility than would be allowed by Plan service alone, an adjustment was required for V&A. No comparable adjustment is needed with the new model in these situations.

Furthermore, the new model allows easy and dynamic examination of individual member records, which is not a feature of V&A. This was a significant factor in the assessment of many of the issues described in this Report.

2. Computation of Accrued Liabilities

The EFI V&A Model and the CalPERS Actuarial Valuation System (AVS) compute entry age normal past service liabilities and normal costs slightly differently. For a typical group, the V&A System will produce past service liabilities about 4% higher than that produced by AVS. Either approach is acceptable; that adopted by AVS is probably more common. Consequently, where this difference produced a significant effect on plan cost, the V&A Model was modified to reflect this methodological difference.

The new valuation model was designed from the outset to compute entry age normal past service liabilities and normal cost in the same manner as AVS. Accordingly, no adjustments were necessary.

3. Computation of Liabilities

   The EFI V&A Model computes liabilities by discounting future cash flows; the new valuation model uses the traditional approach of actuarial commutation functions. Some computations, such as the impact of the PPPA, are easily computed under V&A, but require small adjustments in the new model.

Overall, the new EFI valuation system and V&A get to the same destination – the same liabilities and costs – but do so by different routes. This orthogonal approach to parallel valuation greatly improves the quality and thoroughness of these audits.

Audits of the 2003 & 2005 Annual Valuations of the Public Agencies

Under Tasks 1 and 4 of the Contract, EFI Actuaries (EFI) conducted actuarial valuations as of June 30, 2003 and as of June 30, 2005 for a sample of the Pension Plans for Contracting Public Agencies of the California Public Employees' Retirement System (CalPERS). The purpose of these valuations was to validate independently the actuarial valuations of these plans performed by CalPERS' staff actuaries as of the same date.

Principal Results

As a result of our efforts, we were able to certify that – with a few exceptions – the liabilities and costs computed in the staff valuations as of June 30, 2003 and June 30, 2005 were reasonably accurate and were computed in accordance with generally accepted actuarial principles. Based on the data, assumptions, and methods employed in the staff valuations, the costs independently computed by EFI were within 5% of those in the staff valuations for almost all audited plans.

In the course of these audits, extensive analysis of test lives was performed as part of the parallel valuations as of June 30, 2003. For all of the individual plans included in the audit, sample lives were provided to us for each valuation group – active, inactive, transfers, and retirees – and for each plan. For each plan we audited, even when the total plan results produced by EFI and by CalPERS staff were closely comparable, we reviewed the individual valuation group results as well as test life results. In this way, we hoped to detect any error in the valuations that might otherwise have been hidden by an offsetting error.

Parallel valuations were conducted for 20 participating public agency plans. The ten largest public agency plans were selected based on the number of active and inactive members. In addition, another ten plans were selected at random; for the most part, these were plans of small agencies, since most of the contracting agencies are small.

Many of the public agency plans contain multiple sets of benefit provisions. For example, Riverside County sponsors different benefit provisions for various tiers of miscellaneous and safety members. Separate parallel valuations were also run for the six risk pools discussed below. In all, parallel valuations were completed for 32 separate plans.

Review of Methods and Assumptions

The actuarial methods and assumptions used in the public agency valuations are well within acceptable standards of actuarial practice.

Both CalPERS staff and EFI ignored the possible impact of benefit limitations under Internal Revenue Code Section 415 on liabilities and contribution rates. The effect of this Code section on overall liabilities and costs is negligible.

Parallel Valuation Results

As noted above, with only a few exceptions, based on the data, assumptions, and methods employed in the staff valuations, the costs independently computed by EFI in our parallel actuarial valuations were within 5% of those in the staff valuations.

Given the number of plans studied and the tight tolerance of 5% for plan costs, it is not unexpected to find a few plans for which the EFI and CalPERS staff valuations produced slightly different results. This situation occurred for two individual plans and for one pool as of June 30, 2003.

Individual Plans

For two plans – the Riverside County Safety Plan and the City of Long Beach Miscellaneous Plan, the employer contribution rates computed by EFI were not within 5% of those resulting from the staff valuations. However, the liabilities and total normal costs computed by EFI were very close to those computed by CalPERS' staff.

Tables 1 and 2 below summarize the results for the plans with audit results outside of the 5% tolerance level.

Table 1: Public Agency valuations as of June 30, 2003, Individual Plans

	Fully Projected Liability	Accrued Liability	Total Normal Cost ($)	Employer Contribution Rate
Long Beach Miscellaneous Plan				
EFI	1,560,158,528	1,269,322,613	37,663,831	12.235%
CalPERS	1,520,131,150	1,234,749,237	38,254,531	11.325%
Ratio	102.6%	102.8%	98.5%	108.0%
Riverside Safety Plan				
EFI	1,247,741,338	896,393,969	40,585,947	19.967%
CalPERS	1,255,357,096	906,507,089	41,723,649	21.122%
Ratio	99.4%	98.9%	97.3%	94.5%

As of June 30, 2005, for four miscellaneous plans – the City of Adelanto, the County of Monterey, San Francisco BART, and the City of Whittier – the employer contribution rates computed by EFI were not within 5% of those resulting from the staff valuations. However, the liabilities and total normal costs computed by EFI were very close to those computed by CalPERS staff.

Table 2: Public Agency valuations as of June 30, 2005, Individual Plans

	Fully Projected Liability	Accrued Liability	Total Normal Cost ($)	Employer Contribution (% Pay)
Adelanto, City of				
EFI	6,298,384	1,285,509	621,283	6.587%
CalPERS	6,352,724	1,259,395	601,910	6.988%
Ratio	99.1%	102.1%	96.9%	94.3%
Monterey, County of				
EFI	968,495,247	736,721,742	29,719,275	10.440%
CalPERS	950,882,940	668,016,347	29,753,092	9.900%
Ratio	101.9%	102.1%	99.9%	105.5%
San Francisco BART				
EFI	1,397,292,836	1,156,589,427	34,395,245	10.570%
CalPERS	1,375,339,061	1,138,542,605	34,204,732	9.850%
Ratio	101.6%	101.6%	100.6%	107.3%
Whittier, City of				
EFI	111,927,207	92,093,410	2,475,744	6.770%
CalPERS	110,306,090	91,083,799	2,478,641	6.428%
Ratio	101.5%	101.1%	99.9%	105.3%

We note that in the above cases, the liabilities and total normal costs are very close and that the differences in the employer contribution are a result of sensitivities rather than material differences. Accordingly, we feel no hesitation in confirming the results of the CalPERS staff valuations for these plans.

Risk Pools

The CalPERS Board and staff recently combined many of the public agency plans within the System into various risk pools (five miscellaneous, four safety, and one inactive). The total number of plans within risk pools as of June 30, 2005 was 1,600. The computation of cost for a plan within a risk pool is comprised of three components: an amortization of the side fund created at entry into the pool, normal cost, and amortization of the pool's unfunded liability. The normal cost is determined based on the pool at large; however, there are two adjustments: additional surcharges based on Class 1 benefits, and a phase out of the difference between the plan's normal cost (at entry into risk pool) and the normal cost of the pool. This phase out can be positive or negative.

To verify the liabilities and costs for an entire risk pool, a parallel valuation is conducted in the same manner as for the non-pooled plans (described above). We conducted parallel valuations for all risk

pools as of June 30, 2003 and two risk pools as of June 30, 2005. The liabilities and costs measured by EFI were within the 5% of those measured by CalPERS staff in most cases.

The one case in which the valuation results were more than 5% apart as of June 30, 2003 was Pool 7 (Safety Plan – 2.5% @ 50), as shown in Table 3 below.

Table 3: Public Agency valuations as of June 30, 2003, Risk Pools

	Fully Projected Liability	Accrued Liability	Total Normal Cost ($)	Employer Contribution Rate
Pool 7 Safety Plan – 2.5% @ 50				
EFI	1,625,273,044	1,212,391,189	42,968,082	12.204%
CalPERS	1,625,564,826	1,218,082,935	41,560,955	11.510%
Ratio	100.0%	99.5%	103.4%	106.0%

As with the individual plans, the liabilities and total normal cost are very close and the differences in the employer contribution are a result of sensitivities rather than material differences. Thus, we are able to confirm the results of the CalPERS staff valuations of the risk pools.

The following chart summarizes the comparison of results for all plans within the 2005 audit.

Table 4: Public Agency valuations as of June 30, 2005, Risk Pool Summary

EFI Valuation results versus PERS	Fully Projected Liability	Total Accrued Liability	Total Normal Cost
Percentage of Plans and Pools within 1%	40%	28%	32%
Percentage of Plans and Pools within 3%	96%	92%	84%
Percentage of Plans and Pools within 5%	100%	100%	100%

Surcharges

For each risk pool, there is a set of baseline benefits (e.g. 2% COLA, no continuance benefit). For plans within a pool that have more valuable benefits, known as Class 1 benefits (e.g. 3% COLA, 25% continuance benefit), surcharges are assessed so that the individual agency, rather than the entire pool, pays for the cost of these benefits.

To verify the total of all surcharges, a second parallel valuation was run, applying only baseline benefits. Through this process, we were able to independently compute the baseline employer contribution rates for Pool 4 and Pool 9 within 5% of those computed by staff.

In order to assess the reasonability of individual pooled plan costs, we reviewed all surcharges for Class 1 benefits, as shown in the valuation reports for Pools 4 and 9. While the values of the surcharges appear to be reasonable, there were several issues that warrant comment.

- There are two benefit types, Cost of Living Adjustments (COLA) and Post Retirement Survivor Allowances (PRSA), which have been "grouped" for the purpose of pooled plan surcharges. The same surcharge is applied for 3%, 4%, or 5% COLAs. This makes sense for the actuarial valuation since 3% is assumed to be the maximum (COLA cannot exceed inflation); however, in reality a 4% or 5% COLA is a more valuable benefit than a 3% COLA. Use of a stochastic model for future inflation may be useful to determine an adjustment to these surcharges.

- Likewise, the PRSA surcharge is the same for both the 25% and the 50% allowance. Our understanding is that this is done to simplify the administration of the plan.

The consequence of the continuance and COLA surcharges mentioned above is to spread the additional costs of these benefits throughout the pool. Since the purpose of the surcharges is to adjust the costs for agencies with significantly different benefits, we recommend considering a revision in practice in terms of determination of surcharges.

Side Funds

We verified side fund amortization payments for one randomly selected plan within each risk pool. Our calculations matched those done by CalPERS staff exactly. The only concern we have is that for one of the pooled plans (East Bay Dischargers, Miscellaneous Pool 3), the remaining period for amortization is 34 years, slightly outside of the generally accepted maximum period of 30 years. This is not a serious concern as the side fund is positive (i.e. side fund payments *reduce* the total contribution).

As shown above, our independent valuation results (liabilities and normal costs) are within 5% for all of the plans and pools within the audit. Furthermore, results were within 3% for most of the plans and pools, and within 1% for about one-third of the plans and pools. Accordingly, we are able to confidently certify the results of the actuarial valuation as of June 30, 2005.

Reconciliation of Results

We have noted that the total liabilities for each plan and each experience pool were measured by EFI to be within 5% of the corresponding numbers measured by CalPERS' staff. We also found that in almost all cases this was true when comparing liabilities of individual valuation groups. There were several instances in which a discrepancy was noticed in one individual valuation group – for example, transfers. In these cases, we found it necessary to both compare individual test life liabilities, and to look at individual benefits for them (retirement, death, disability etc.).

As a result of this procedure, we conducted a comparison for nearly all of the sample lives provided. We found that the individual test life liabilities were very close to those computed by EFI in most cases. For the sample lives in which a discrepancy did appear, we were able to communicate with CalPERS' staff to gain a better understanding of the issue, and if appropriate, refine our valuation model further.

In Tables 1, 2, and 3 above, we listed the plans and pools in which the liabilities and total normal costs calculated independently by EFI are within 5% of those calculated by CalPERS AVS, but the employer cost differed by more than 5%. The reasons for these differences in cost are as follows:

- Relative Magnitude Of Unfunded Actuarially Accrued Liability

  In some cases, a small discrepancy in the actuarial liability is exacerbated when computing the unfunded actuarial accrued liability. This is due to the magnitude of the unfunded portion of the actuarial accrued liability when compared to the total accrued liability. This has a direct effect on the total cost because one component of the total cost is the amortization of the unfunded liability.

  For all but two of the individual plans, this phenomenon did not greatly distort the total cost results. However, the impact on cost on those two plans was noted above.

- Total Normal Cost Versus Employer Normal Cost

  In all cases, the total normal cost calculated by EFI is within 5% of that calculated by AVS. Calculating the employer portion by reducing the total by the employee contributions magnifies small discrepancies in the total. This, much like the unfunded actuarial accrued liability issue above, has an impact on total cost.

These issues have appeared in the past, and are always prone to cause anomalies within the audit, especially when funding ratios are close to 100%. If either of the above causes the costs from the parallel valuation to be off by more than 5%, we evaluate the reasonableness of results based on the underlying liabilities and normal costs.

Other Issues

During the preparation of the parallel valuations, a number of issues arose that EFI deemed worthy of comment.

- Transferred Members

  Participants who are employed at more than one public agency during the course of their careers require special handling for valuation purposes.

  One source of difference between the CalPERS valuations and the EFI parallel valuations is the calculation of liabilities for transferred participants, specifically for death and disability benefits.

This does not represent a significant source of error because in most plans the transfer liability represents a very small portion of the total.

According to the plan provisions published in Appendix B of CalPERS public agency reports, transferred participants are entitled to the following benefits:

- Retirement/vesting/refund – A pro-rata portion of their total benefit based on contributions or service at the prior employer
- Ordinary disability – A pro-rata portion of their total benefit based on service at the prior employer
- Duty disability – A return of member contributions
- Pre-retirement death – None

During the analysis of several dozen individual sample lives we discovered that the retirement, vesting, ordinary disability, and refund benefits appear to have been valued properly. However, the pre-retirement death benefit appears to be a refund of contributions when the death is duty-related. This is likely actual administrative practice, and is also appropriate. The only inconsistency is the description shown in the valuation report.

For non-job-related deaths, a liability is computed in the CalPERS staff valuation that is not associated with a contribution refund. This is a very small portion of the total liability for any given participant, and is extremely small when compared to the liability of the plan. It is a possibility that this is just a reporting issue similar to the above. We recommend that the language in the reports regarding death and disability benefits for transferred members be reviewed and edited if necessary.

For duty-related disabilities, the report indicates that the benefit is simply a refund of contributions. However, the liabilities calculated for these individuals, again based on the sample lives provided, show that a much greater benefit is being valued. This is appropriate: In the event that a member becomes disabled while eligible for retirement, a retirement benefit would be paid. As described above, a retirement benefit is calculated on a pro-rata basis, with a portion of it being the responsibility of the former employer.

Therefore, as for the death benefit, the wording of the duty disability benefit description for transferred members in the actuarial valuation report should be reviewed and edited if necessary.

None of these issues caused the overall valuation results to come into question.

- Part-Time Participants

  During the course of our review of the individual active life samples, we examined the valuation of part-time employees; it appeared that the liabilities of these members were computed using a different method than is used for the full-time active members. This issue is material, since for several of the audited plans, there is a significant number of part-time employees.

  According to the materials published on the CalPERS website, the retirement benefit of a part-time employee is calculated based on annualized pay and partial service credits. The method of valuation employed by CalPERS' staff takes this into account by annualizing pay and projecting partial service for benefit purposes. However, to accurately reflect the actual pay expected in future years, the present value of future pay is calculated on a part-time basis, rather than based on annualized pay.

  We found this method to be reasonable and appropriate, causing no material misstatement in liabilities or costs.

- Future Costs

  For many of the CalPERS plans, including the public agency plans that have been audited, there are considerable levels of unrecognized actuarial losses due to past asset and demographic experience. This will result in increased plan costs for the next one or two decades as the losses are amortized.

Audits of the 2003 & 2006 Annual Valuations of the State and Schools

Under Tasks 2 and 5 of the Contract, EFI Actuaries conducted actuarial valuations as of June 30, 2003 and June 30, 2006 of the State and Schools Pension Plans of the California Public Employees' Retirement System (CalPERS). The purpose of these valuations was to validate independently the actuarial valuations of these plans performed by CalPERS' staff actuaries as of the same date.

Principal Results

As a result of our efforts, we were able to certify that the liabilities and costs computed by the staff as of June 30, 2003 and June 30, 2006 were reasonably accurate and were computed in accordance with generally accepted actuarial principles. In fact, based on the data, assumptions, and methods employed in the staff valuations, the costs independently computed by EFI were within 5% of those in the staff valuations for each plan.

The work produced by the Actuarial Office currently maintains a high professional standard, and it continues to improve. During the term of the Contract, the actuarial valuations of the State and Schools have been of consistently high quality. Furthermore, any issues arising during the parallel valuation effort were discussed with PERS Staff and resolved to our satisfaction.

Review of Methods and Assumptions

Based on our parallel valuations of the State Plans and the County Schools Pool, EFI Actuaries certifies that the accrued liabilities and employer contributions computed by the CalPERS Actuarial Office are accurate within professional tolerances and were calculated in accordance with generally accepted actuarial practices.

In actuarial valuations prior to June 30, 2003, liabilities and costs were computed assuming that assets in the Public Employees' Retirement Fund (PERF) would return 8.25% annually. This assumption was based in turn on an assumed inflation rate of 3.5% and on annual administrative and investment expenses of about 0.25%. The pay of active members is assumed to increase 0.25% faster than inflation due to productivity increases.

An analysis of past economic statistics suggested that assumed rates of return should range from 7% to 8% based on the allocation of assets in PERF and a 3.5% inflation assumption. Therefore, while the prior set of actuarial assumptions was within the range of acceptable practice, we regarded the assumptions as somewhat optimistic.

Beginning with the actuarial valuation as of June 30, 2003, the economic assumptions have been changed. The assumed rates of return, salary growth, and inflation have all been decreased by 0.5%. While the assumed real rate of return (investment return over inflation) has not been changed, the lower rates are, in our opinion, closer to the mid-point of reasonable expectations for

the future. We applaud the change. Plan liabilities and costs should be more accurate and stable under the new set of rates than previously.

There were a few areas in which the methods and assumptions adopted by PERS staff differed from those recommended by EFI. These have been discussed with staff, and are explained in more detail below. Briefly, they are as follows:

- There are several plans in which there are a significant number of transferred members, causing vesting and benefit service to differ. For these plans, we recommend that during the next actuarial experience study rates of termination and pay increase should be studied against both types of service. This offers the possibility of improving the accuracy of the actuarial assumptions for these plans.

- For purposes of projecting payroll for the amortization of State Miscellaneous unfunded liabilities, we recommend that Tier 2 payroll be projected using the expected termination and hire patterns in State Miscellaneous, rather than by using a fixed rate of annual decrease in payroll.

- Deaths among active members can occur from either service or non-service related causes. Among general service members, service deaths are so rare that there is no assumption for service (duty) deaths among these members. Of course, actuarial valuations for safety members contain assumptions for both duty and non-duty deaths among active members.

  In reviewing several individual test life calculations, we noticed that duty mortality rates were being erroneously applied for Miscellaneous Plan members and for Schools Plan members. Only non-duty death rates should be assumed for these general service members. As a result, there is a modest overstatement of employer contributions for these two plans.

  Since death benefits do not represent a significant portion of the plans' liabilities, the impact of this error is not significant. Table 5 below shows the impact of the incorrect application of duty death rates on actuarial calculations.

  Table 5 demonstrates that applying the duty death mortality rates to general service members increased the normal cost of the State Miscellaneous and Schools Plans by about 0.08% of payroll, while causing a small (0.10%) understatement in the accrued liability. These effects combined to increase cost by 0.033% of payroll above the correct level for the State Miscellaneous, and 0.057% for the Schools Pool.

  Therefore, the impact on valuation results of this error is very small. The impact on Group Term Life Insurance calculations could be more noticeable, as discussed below. Discussions with PERS Staff have confirmed that the impact of this issue is not material, and that a correction will be made going forward.

Table 5: State & Schools Effect of Assuming Duty Mortality for Active Participants

Valuation Result (Active Participants Only)	Miscellaneous Plan	Schools Plan
Present Value of Future Benefits	0.04%	0.20%
Accrued Liability	(0.10%)	(0.10%)
Present Value of Future Salary	(0.20%)	(0.20%)
Total Normal Cost	0.080% of pay	0.085% of pay
Employer Contribution	0.033% of pay	0.057% of pay

Parallel Valuation Results

The tables below show the liabilities, total normal cost rates, and employer contribution rates, and total cost computed by CalPERS staff and by EFI for each of the State and Schools plans.

Table 6: State & Schools Comparison of Employer Contribution Rate* (% of payroll) as of June 30, 2003

Plan	AESD Cost	EFI Cost	Relative Difference
State Miscellaneous Tier 1&2	16.260%	16.641%	2.3%
State Industrial	16.295%	16.505%	1.3%
State Safety	20.635%	20.755%	0.6%
State Peace Officers and Firefighters	23.763%	24.935%	4.9%
California Highway Patrol	33.434%	33.127%	(0.9%)
County Schools	9.952%	9.859%	(0.9%)

* Does not include rate for GTLI benefits

Table 7: State & Schools Comparison of Present Value of Future Benefits ($ millions) as of June 30, 2006

Plan	PVFB as Computed by PERS	PVFB as Computed by EFI	Relative Difference
State Miscellaneous	71,711	72,032	0.4%
State Industrial	2,469	2,459	(0.4%)
State Safety*	5,853	5,855	0.0%
State Peace Officers & Firefighters*	26,396	26,195	(0.8%)
California Highway Patrol	6,937	7,017	1.2%
Total State	**113,366**	**113,558**	**0.2%**
County Schools Pool	**52,609**	**53,630**	**1.9%**

* Reflects liability transfer

Table 8: State & Schools Comparison of Accrued Liabilities ($ millions) as of June 30, 2006

Plan	Accrued Liability as Computed by PERS	Accrued Liability as Computed by EFI	Relative Difference
State Miscellaneous	61,299	61,927	1.0%
State Industrial	1,870	1,898	1.5%
State Safety*	3,907	3,896	(0.3%)
State Peace Officers & Firefighters*	19,737	19,838	0.5%
California Highway Patrol	5,744	5,698	(0.8%)
Total State	**92,557**	**93,257**	**0.8%**
County Schools Pool	**41,409**	**41,270**	**(0.3%)**

*Reflects liability transfer

Table 9: State & Schools Comparison of Total Normal Cost (% of payroll) as of June 30, 2006

Plan	Normal Cost Rate as Computed by PERS	Normal Cost Rate as Computed by EFI	Relative Difference
State Miscellaneous Tier 1	14.372%	14.012%	(2.5%)
State Miscellaneous Tier 2	9.846%	9.625%	(2.2%)
State Industrial	17.510%	17.208%	(1.7%)
State Safety	21.112%	20.974%	(0.7%)
State Peace Officers & Firefighters	24.644%	23.650%	(4.0%)
California Highway Patrol	23.552%	22.878%	(2.9%)
Total State	**17.468%**	**16.990%**	**(2.7%)**
County Schools Pool	**14.421%**	**14.199%**	**(1.5%)**

Table 10: State & Schools Comparison of Employer Contribution Rate* (% of payroll) as of June 30, 2006

Plan	Contribution Rate as Computed by PERS	Contribution Rate as Computed by EFI	Relative Difference
State Miscellaneous Tier 1	16.633%	16.796%	1.0%
State Miscellaneous Tier 2	16.565%	16.844%	1.7%
State Industrial	17.319%	17.653%	1.9%
State Safety	18.835%	18.829%	(0.0%)
State Peace Officers & Firefighters	25.552%	24.965%	(2.3%)
California Highway Patrol	32.115%	30.866%	(3.9%)
Total State	**19.371%**	**19.317%**	**(0.3%)**
County Schools Pool	**9.306%**	**8.994%**	**(3.4%)**

* Does not include rate for GTLI benefits

Table 11: State & Schools Comparison of Employer Cost ($ millions) as of June 30, 2006

Plan	PERS Total Contribution for Fiscal Year 2008	EFI Total Contribution for Fiscal Year 2008	Relative Difference
State	$ 2,747	$ 2,732	(0.5%)
County Schools Pool	920	887	(3.6%)
Total	**$3,667**	**$3,619**	**(1.3%)**

Other Issues

During the two audits of the State and Schools Plans, comments were made by EFI regarding a number of other issues.

- Contribution Rate Sensitivity

  As shown in the tables above, the accrued liability and total normal cost calculations determined by EFI were within 5% of those determined by PERS in all cases, and within 3% in most cases. The total contribution based on EFI calculations for all plans combined is $3.619 billion as of June 30, 2006, which is within 1.3% of the amount of $3.667 billion shown in the valuation report.

  In performing a parallel valuation, it is important to note that the employer contribution rate is very sensitive to small changes in plan liabilities. For a funded plan, a small difference in accrued liability will result in a much larger difference in the unfunded accrued liability. Add to this the presence of employee contributions, and small liability differences translate to large impacts on the total contribution rate. For example, even though the accrued liability and total normal cost computed by EFI for the County Schools Pool as of June 30, 2006 were within 0.3% and 1.5% respectively of those determined in the staff valuations, the total cost computed by EFI was more than 3% lower.

  This is not a temporary anomaly – the issue will always have the potential to distort total cost results. For this reason, during the audits we focus principally on the comparison of normal cost and liabilities, as well as comparisons of data and other present value calculations.

- Service Issues

  As part of our review, we compared the results of "test life" computations performed by CalPERS staff with those performed by EFI. A test life is a single member record that is analyzed in detail by an actuarial modeling system. By studying the output of such test life calculations, the accuracy of the actuarial software can be verified.

  During our examination of test lives and valuation results, we noticed that many individual active participants have different amounts of vesting service and benefit service. This is unusual in most plans: Typically vesting and benefit service are measured from the date of hire. However, when members transfer between plans within a common system, they may earn vesting service from their original date of hire, but benefit service only while in a particular plan. This situation – which is fairly common within CalPERS – makes the actuarial calculations a bit complicated as decrements, vesting, and eligibility are based on vesting service, but benefit amounts are based on benefit service.

As noted earlier in this Report, we developed a new actuarial valuation system specifically for the State & Schools valuations which allows us to investigate the impact of these service differences, as well as other nuances in the application of actuarial methods and assumptions.

Differences in vesting versus benefit service often impact valuation results significantly. As noted above, assumed rates of decrement and salary increase are based on vesting service. For example, consider a Schools member with ten years of vesting service and five years of benefit service. The normal cost for this member varies by about 9% depending on whether vesting service or benefit service is used to decide which decrement rates to apply. For plans with a substantial portion of the membership with service in more than one CalPERS plan, there could be a significant impact on valuation results and employer contribution rates.

After extensive review and analysis, we believe that the methods used by PERS staff to compute plan costs and liabilities with respect to service differences are well within reason and acceptable practice. For future experience studies, we recommend that the impact of retirement and termination behavior as well as salary increases be examined on both bases (vesting service and benefit service) to determine which yields the strongest correlation with member behavior.

- POFF Liability Transfer

  A portion of the retirees in the State Safety Plan should actually be included in the State Peace Officers and Fire Fighters Plan. This group is closed, and represents about 87% of the members who retired in the State Safety Plan before 1984. Accordingly, during each annual valuation of the State Safety Plan and the State Peace Officers and Fire Fighters Plan, a liability is calculated for a fixed portion of the pre-1984 retiree liability for the Safety Plan and transferred from the State Safety Plan to the State Peace Officers and Fire Fighters Plan. For the June 30, 2006 valuation, the amount of this liability was approximately $398 million.

  To verify this amount, we recomputed the liability using the same actuarial methods and assumptions. The liability EFI calculated - $403 million - was within 1.3% of the liability calculated by PERS staff, on a relative basis.

  While this is not a substantial part of the valuation of the state Plans, the confirmation of this number provides an added degree of assurance that the valuation results are reasonable. It is somewhat of an audit within an audit: The calculation deals with only a small subgroup of a population, so the fact that we are able to match so closely is further confirmation that the staff valuation is reliable. This liability will decrease over time as pre-1984 retirees die. At some point, the impact will disappear.

- Group Term Life Insurance Benefits

  As part of the valuation of the State Plans, a contribution rate is developed for Group Term Life

Insurance (GTLI) benefits. This contribution is based on the excess of the term cost (150% of expected benefit payments) over the actuarial value of GTLI assets held by the plan.

As of June 30, 2006, a contribution was required for two of the State plans – California Highway Patrol (CHP) and State Industrial. Because assets exceeded the term cost for the remaining State plans, no contribution was necessary.

Using the term cost methodology employed by PERS, we were able to confirm that only the CHP and Industrial plans required contributions. When we projected GTLI benefit payments for these two groups, our results were very close (within 8% in each case) to those computed by PERS and shown in the valuation report. (Because assets are nearly equal to term costs, the contribution rates are very small, so they are extremely sensitive to differences in the expected benefit payments. Consequently, we compare only projected benefits).

A hidden problem with the duty mortality issue discussed above is that, while it has a negligible impact on pension plan costs, it does have a more noticeable impact on expected GTLI payments, because the total benefit payments are solely based on death benefits. We estimate that assuming duty mortality applies to general service employees caused a 28% increase in expected GTLI payments to Miscellaneous Plan members. Since no GTLI contribution rate was required for the Miscellaneous Plan, this had no bearing. However, it does make one aware of possible unexpected consequences of otherwise small changes in assumptions.

Since all six State plans provide the same GTLI benefit, it may be appropriate to combine the GTLI funds of these plans and perform just one cost calculation. As of June 30, 2006, GLTI assets exceed term cost by over $3 million. Combining all plans would result in no required contribution to GTLI for all State plans. We also note that the actuarial value of assets for the CHP Plan is currently negative due to heavier than expected claims. This is not surprising as benefit payments may fluctuate by more than 50% from one year to the next. Combining the plans into one would greatly reduce claims variability, which would in turn mitigate the possibility of negative assets, since benefit fluctuations would be smoothed by virtue of a larger pool of participants.

- Purchasing Power Protection Allowance

  All of the State and Schools plans provide retirees with a Purchasing Power Protection Allowance (PPPA), which grants an increase in benefits when actual cost-of-living adjustments (COLAs) do not reasonably keep up with actual inflation. During the course of the audit, two issues pertaining to PPPA were revealed.

  The CalPERS Actuarial Valuation System (AVS) was modified several years ago to use the current PPPA payment from the input data and calculate future PPPA payments when appropriate. After a comprehensive review of several sets of beneficiary data, it was discovered that AVS recalculates a PPPA if a beneficiary is receiving payments as the result of a member's

death in service. As a result, any beneficiary of a member who died in service and who received an ad hoc COLA in the 1970s or early 1980s would be valued with a higher total benefit than their actual payment amount.

The second issue also deals with data processing. As part of the AVS valuation, multiple retiree records for the same member are often are combined into a single record. This is a reasonable and efficient approach; however, occasionally records are combined that should have been left separate because one is the member's own benefit and the other record is a beneficiary record (i.e., the member is receiving a second benefit as a result of the spouse's death). In some cases, this results in the calculation of a PPPA benefit that is not actually due. It may also result in the combined benefit being shown as payable in one benefit form, when in reality there should be two forms of benefit payment (e.g. single life annuity and 25% continuation).

Neither of the above causes a material change in plan liabilities: Only a small number of retirees are affected, and the differences in benefit amounts are relatively low. Discussions with PERS Staff have indicated that the processes described above will be revised to more accurately reflect actual benefits paid.

- Miscellaneous Tier 1/Tier 2 Dynamics

As a result of SB 400, new State Miscellaneous hires generally join Tier 1. Furthermore, current Tier 2 members may transfer to Tier 1, provided that they either make up for past contributions or accept an actuarially reduced retirement benefit. As a result, Tier 2 active membership may be expected to decline over time as Tier 2 members retire, terminate, become disabled, die, or transfer to Tier 1 and are not replaced by new hires. This gives rise to several issues.

Benefits

Handling of active members by AVS is done by the following process:

1. Project the hypothetical Tier 2 employee contribution balance to retirement;
2. Assume that the member will elect to join Tier 1 at retirement and take the 2% @ 55 formula; and
3. Actuarially convert the hypothetical Tier 2 contribution balance into a lifetime deduction from the Tier 1 pension benefit.

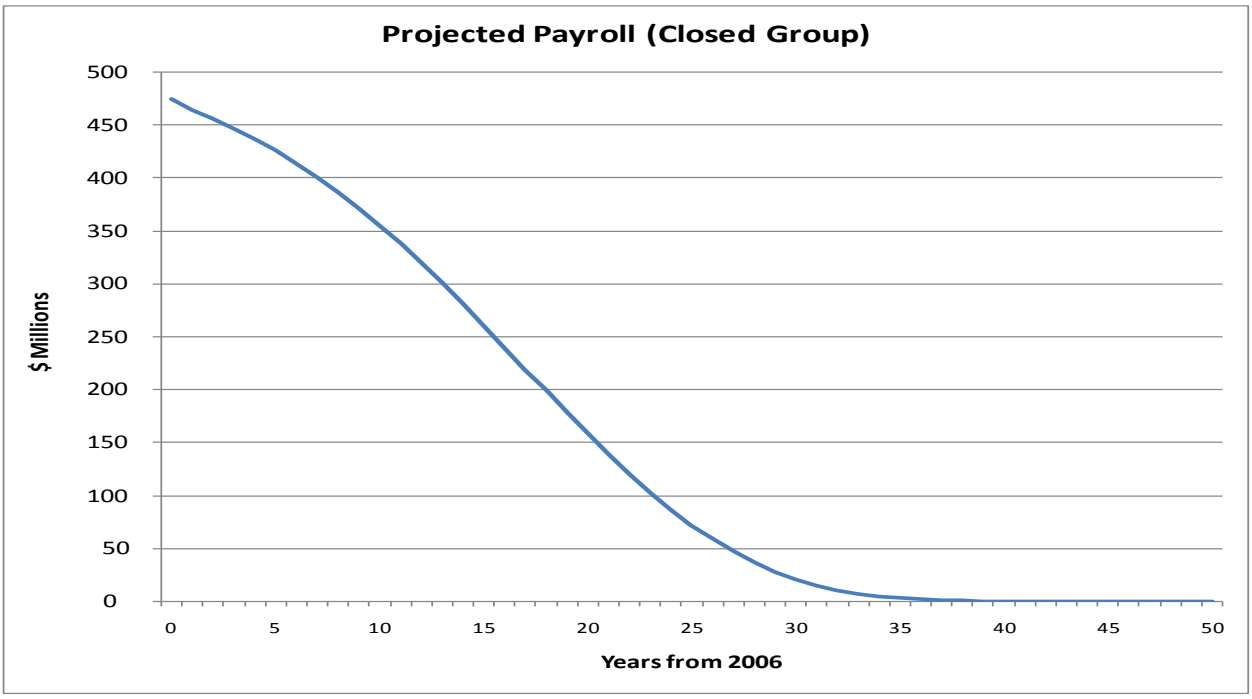
We reviewed this approach and found it be reasonable and sufficiently conservative, and we created a valuation model which mimics the same methodology. The normal cost for Tier 2 members we computed is within 2.2% of that computed by PERS.

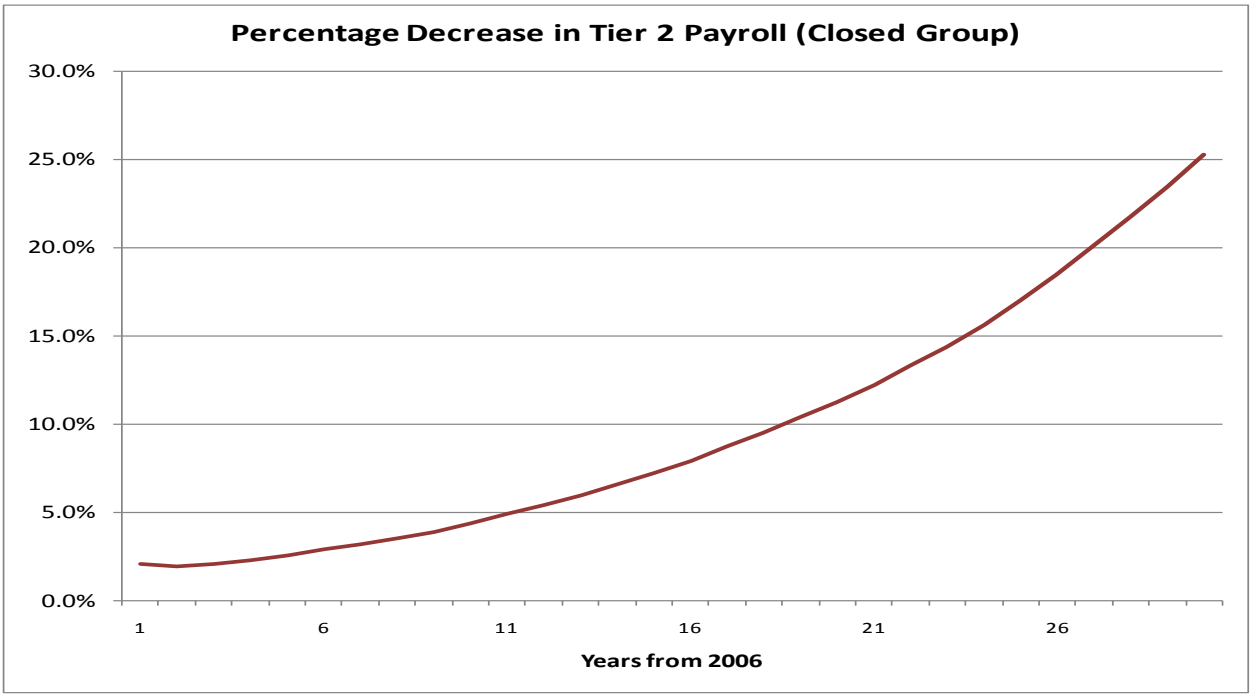
Payroll Projection

It is currently assumed that Tier 2 payroll will decrease by 1% per year in projecting employer

contributions. This assumption has been in place since 2000, and is still reasonably accurate; however, it will need to be monitored for an inevitable future adjustment.

The graph below shows a projection of Tier 2 active payroll for the next 50 years assuming no new entrants and no transfers to Tier 1.





Translating the projected payroll into annual changes, we can analyze the expected decrease in Tier 2 payroll, year by year. The results of this analysis are shown in the second graph on the prior page.

The annual decrease in total Tier 2 payroll will quickly grow, as shown in the chart above. Within about 10 years, the expected annual decrease will reach 5%. Based on this analysis, we recommend either an explicit payroll projection to determine the projected contribution amount, or a review of factors every few years.

This factor does not have a significant impact on total Miscellaneous Plan costs, as Tier 1 currently represents about 95% of the total contribution amount.

- Amortization Periods

  As of July 1, 2000, the amortization methods for all State and Schools plans are prescribed in Actuarial Policy ACT-96-05E. Under ACT-96-05E, all changes in liabilities due to plan amendments, changes in actuarial assumptions, or changes in actuarial methodology are amortized over separate 20-year periods. Actuarial gains or losses are tracked; 10% of the net unamortized gain or loss is amortized each year. If a plan has an unfunded accrued liability, the annual contribution with respect to the total unfunded liability may not be less than the amount produced by a 30-year amortization of the unfunded liability.

  As of June 30, 2003, all of the State and Schools plans had an unfunded actuarial accrued liability. Table 12 below shows the effective amortization period in years resulting from the application of Policy ACT-96-05E. For each of the State and Schools plans, the current amortization amount is greater than the amount produced by a 30-year amortization.

Table 12: State & Schools Comparison of Amortization as of June 30, 2003

Plan	Effective Amortization Period (Years)	Current Amortization Payment	Minimum Amortization with 30-Year Period
State Miscellaneous Tier 1&2	23	$598,638,349	$517,507,940
State Industrial	15	$13,461,872	$8,804,691
State Safety	16	$49,938,307	$33,696,917
State Peace Officers and Firefighters	20	$162,620,859	$129,838,252
California Highway Patrol	14	$86,237,950	$54,096,104
County Schools	18	$232,351,157	$174,079,331

Audits of the 2004 & 2007 Annual Valuations of the Judges' Retirement System

Under Tasks 3 and 6 of the Contract, EFI Actuaries conducted actuarial valuations as of June 30, 2004 and June 30, 2007 of the Judges' Retirement System. The purpose of these valuations was to validate independently the actuarial valuations of these plans performed by CalPERS' staff actuaries as of the same date.

Background and Principal Results

As a result of our efforts, we were able to certify that the liabilities and costs computed by the staff as of June 30, 2004 and June 30, 2007 were reasonably accurate and were computed in accordance with generally accepted actuarial principles. In fact, based on the data, assumptions, and methods employed in the staff valuations, the costs independently computed by EFI were within 5% of those in the staff valuations for each plan.

The Judges Retirement System provides pensions and ancillary benefits to judges who were elected or appointed before November 9, 1994. Judges elected or appointed on or after that date are covered under Judges Retirement System II (JRS II). JRS and JRS II are separate retirement plans with separate memberships, separate asset pools, and no financial interrelationship.

Annual valuations of JRS are completed using the Aggregate Actuarial Cost Method. Each year total employer and member contributions are computed so that member pensions are funded as a level or increasing dollar amount for the next 30 years. The pricing process is based on certain assumptions regarding the rate of investment return on System assets, annual pay increases, inflation, turnover and retirement rates, and longevity of members.

A judge who has reached 60 and is credited with 20 or more years of service under the System will be awarded a lifetime pension of 75% of pay in the last judicial office held. Death, disability, and termination benefits are also paid from the System.

Participants contribute 8% of pay. The System is financed by employer and employee contributions and the investment return on System assets.

Employer contributions were in the past determined by law to be 8% of payroll, regardless of the results of the annual valuation. However, the CalPERS Board has adopted a resolution which provides that the recommended contributions shall be actuarially determined. Current and recent valuations recommend contributions based on two alternative funding patterns.

Review of Methods and Assumptions

Actuarial assumptions used to compute System liabilities and employer costs include:

- A 7.0% annual rate of investment return, net of all expenses;

- Annual salary increases of 3.25%;
- Annual inflation of 3.0%;
- Retirement between the ages of 60 and 80 after ten years of service;
- Termination rates from 0.3% to 2.5% per year, depending on age and service; and
- Active and retired mortality rates from the 1994 Group Annuity Mortality Tables for Males and Females published by the Society of Actuaries.

Overall, the actuarial methods and assumptions adopted by CalPERS to compute JRS liabilities and costs are reasonable and in accordance with generally accepted actuarial principles. However, it is possible – but by no means certain – that the discount rate used for JRS accounting disclosures may be changed in the future.

The JRS I System is unfunded; benefits are paid as they come due, and no significant assets have been accumulated. Disclosures under GASB Statements 25 and 27 – including liabilities and the annual required contribution (ARC) – are computed using a 7% discount rate.

The GASB recently released Statements 43 and 45 to define generally accepted accounting principles as they apply to "Other Post-Employment Benefits." Such benefits are non-pension benefits, mainly retiree health insurance. Although Statement 45 deals with non-pension related benefits, the language used is similar (and in many cases identical) to the language used in GASB 25, which applies to pension benefits. The new Statement comments that the approach followed "... generally is consistent ..." between the two, "... with modifications to reflect differences between pension benefits and OPEB".

GASB 45 and its companion Statement GASB 43 were finalized and published in June of 2004. The required effective date for large government plans under the Statement is for periods beginning after December 15, 2006. For GASB 43, which applies to employers who maintain a trust fund for their OPEB plan and contains the same language regarding the determination of the discount rate, the effective date is one year earlier.

Unlike GASB 25, GASB 45 makes specific reference to the determination of the discount rate in situations where the benefits are not completely prefunded – "Accordingly, this Statement requires the use of the long-term expected yield on the investments that are expected to be used to pay benefits as they come due. These would be plan investments for a funded plan, the employer's investments for a pay-as-you-go plan, or a weighted average of expected plan and employer investments for a plan that is partially funded." (Paragraph 120)

In the same paragraph, the Statement contains language considering the use of "A long-term expected-yield rate on a surrogate portfolio, such as the employers' pension plan or a similar

employer's funded OPEB plan". However, this approach was "... rejected as hypothetical and irrelevant to the employer's choice of a financing method for the OPEB plan".

The arguments put forth by GASB in Statement 45 – if they were extended to pension plans – would appear to suggest that since the JRS is unfunded, a lower discount rate may be required, perhaps the rate being earned by the State Treasurer on short-term investments. While the current 7% assumed rate of return is acceptable from an actuarial perspective, its use in accounting disclosures could become questionable in the future.

Even though GASB Statements 43 and 45 do not apply to JRS, and are not yet effective, we recommend that developments in this area be monitored when the discount rate is set in future JRS actuarial reports.

Parallel Valuation Results

The JRS Valuation was performed using the CalPERS Actuarial Valuation System (AVS) to compute liabilities and costs. EFI validated the calculations by creating an *independent* actuarial model to develop the valuation results. The only data common to the two models was the participant data; the EFI model was developed separately, without reference to the system used for the staff Valuation.

Tables 13 and 14 below shows the principal results of the parallel valuations using the 7.0% return assumption and two different funding patterns: Funding Pattern Alternative 1 is a 30-year level dollar amortization; Funding Pattern Alternative 2 is a 30-year increasing amortization, where the dollar contributions increase at 1% per year. We note in this table that the employer cost computed by EFI is very close to that computed by CalPERS staff. There was one measure, the Present Value of Future Employee Contributions, where EFI and CalPERS differed by more than 5%. However, this does not have a significant impact on the overall cost; therefore we do not believe this difference is material.

Table 13: JRS Parallel Valuation Results as of June 30, 2004

	JRS Valuation	EFI Parallel Valuation	EFI to JRS Difference
1. Present Value of Benefits for Active Members	$ 1,090,754,057	$ 1,116,604,782	2.37%
2. Liability for Vested Terminated Members and Alternate Payees with Deferred Benefits	73,748,316	73,729,816	(0.03)%
3. Liability for Members Receiving Benefits	1,297,402,150	1,305,951,038	0.66%
4. Total Fully Projected Liability (1) + (2) + (3)	2,461,904,523	2,496,285,636	1.40%
5. Present Value of Future Employee Contributions	47,978,078	51,535,105	7.41%
6. Assets	4,610,668	4,610,668	0.00%
7. Present Value of Employer Contributions (4) – (5) – (6)	$2,409,315,777	$2,440,139,863	1.28%
8. Employer Normal Cost For Benefits (Alt 1) (7) ÷ 13.27767	181,456,218	183,777,716	1.28%
9. Administrative Expenses	719,312	719,312	0.00%
10. Total Employer Normal Cost (8) + (9)	$182,175,530	$184,497,028	1.27%
11. Total Employer Contribution for FY 2005-06 (Alt 1) [(10) x 1.07]	$194,927,817	$197,411,820	1.27%
12. Employer Normal Cost For Benefits (Alt 2) (7) ÷ 14.67571	164,170,304	166,270,652	1.27%
13. Administrative Expenses	719,312	719,312	0.00%
14. Total Employer Normal Cost (12) + (13)	$164,889,616	$166,989,964	1.27%
15. Total Employer Contribution for FY 2005-06 [(14) x 1.07]	$176,431,889	$178,679,261	1.27%

Table 14: JRS Parallel Valuation Results as of June 30, 2007

	JRS Valuation	EFI Parallel Valuation	EFI to JRS Difference
1. Present Value of Benefits for Active Members	$ 1,069,661,992	$ 1,103,644,396	3.18%
2. Liability for Vested Terminated Members and Alternate Payees with Deferred Benefits	87,615,800	86,621,154	(1.14%)
3. Liability for Members Receiving Benefits	1,686,065,744	1,675,239,770	(0.64%)
4. Total Fully Projected Liability (1) + (2) + (3)	2,843,343,536	2,865,505,320	0.78%
5. Present Value of Future Employee Contributions	32,875,919	36,326,396	10.50%
6. Assets	11,672,313	11,672,313	0.00%
7. Present Value of Employer Contributions (4) – (5) – (6)	$2,798,795,304	$2,817,506,611	0.67%
8. Employer Normal Cost For Benefits (Alt 1) (7) ÷ 13.27767	210,789,642	212,198,873	0.67%
9. Administrative Expenses	701,378	701,378	0.00%
10. Total Employer Normal Cost (8) + (9)	$211,491,020	$212,900,251	0.67%
11. Total Employer Contribution for FY 2008-09 (Alt 1) [(10) x 1.07]	$226,295,391	$227,803,269	0.67%
12. Employer Normal Cost For Benefits (Alt 2) (7) ÷ 14.67571	190,709,363	191,984,348	0.67%
13. Administrative Expenses	701,378	701,378	0.00%
14. Total Employer Normal Cost (12) + (13)	$191,410,741	$192,685,726	0.67%
15. Total Employer Contribution for FY 2008-09 [(14) x 1.07]	$204,809,493	$206,173,727	0.67%

Audits of the 2004 & 2007 Annual Valuations of the Judges' Retirement System II

Under Tasks 3 and 6 of the Contract, EFI Actuaries conducted actuarial valuations as of June 30, 2004 and June 30, 2007 of the Judges' Retirement System II. The purpose of these valuations was to validate independently the actuarial valuations of these plans performed by CalPERS' staff actuaries as of the same date.

Background and Principal Results

As a result of our efforts, we were able to certify that the liabilities and costs computed by the staff as of June 30, 2004 and June 30, 2007 were reasonably accurate and were computed in accordance with generally accepted actuarial principles. In fact, based on the data, assumptions, and methods employed in the staff valuations, the costs independently computed by EFI were within 5% of those in the staff valuations for each plan.

Judges Retirement System II provides pensions and ancillary benefits to judges who were elected or appointed on or after November 9, 1994. Judges elected or appointed prior to that date are covered under Judges Retirement System I (JRS I). JRS I and JRS II are separate retirement plans with separate memberships, separate asset pools, and no financial interrelationship.

Annual valuations of JRS II are completed using the Aggregate Entry Age Normal Funding Method. Each year total employer and member contributions are computed so that member pensions are funded as a level percentage of pay during their working lives. The pricing process is based on certain assumptions regarding the rate of investment return on System assets, annual pay increases, inflation, turnover and retirement rates, and longevity of members.

A judge who has reached 65 and is credited with 20 or more years of service under the System, or who has reached age 70 with five or more years, will be awarded either a lifetime pension or will be paid the balance of his or her monetary credits. The retiring judge makes the choice. The pension benefit is 3.75% of highest 12 months pay per year of service, up to 75%. The monetary credit balance is the accumulation of 8% of pay in employee contributions and 10% of pay designated as employer contributions from date of election or appointment. Death, disability, and termination benefits are also paid from the System.

Judges retiring under JRS II are entitled to a portion of the employer portion of post-retirement health premiums from the System. However, this benefit was not included in the JRS II Valuation or in the EFI parallel valuation: It is assumed to be financed by the employers outside of the JRS II System.

Participants contribute 8% of pay. The System is financed by employer and employee contributions and the investment return on System assets.

Review of Methods and Assumptions

Overall, the actuarial methods and assumptions adopted by CalPERS to compute JRS II liabilities and costs are reasonable and in accordance with generally accepted actuarial principles. However, the method used to amortize the unfunded actuarial accrued liability violates current accounting standards. While the issue is not presently material, it should be addressed. In addition, we have some comments concerning the method used to smooth Plan assets for funding determinations.

Actuarial assumptions used to compute System liabilities and normal costs include:

- An 7.25% annual rate of investment return, net of all expenses;
- Annual salary increases of 3.25%;
- Annual inflation of 3.0%;
- The overall payroll is projected to grow due to the interaction of the average annual salary increase of 3.25% and an increase in the projected number of actives. The number of actives is projected to increase each year by the projected decrease in the number of actives in the Judges' Retirement System (JRS I).
- Retirement between the ages of 65 and 70 after five years of service;
- Termination rates from 0.225% to 0.9% per year, depending on age and service; and
- Retired mortality rates approximately the same as the 1994 Group Annuity Mortality Tables for Males and Females published by the Society of Actuaries.

Parallel Valuation Results

The JRS II Valuation was performed using the CalPERS Valuation System to compute liabilities and costs. EFI validated the CalPERS actuarial calculations by creating an *independent* actuarial model to develop the valuation results. The only data common to the two models was the participant data; the EFI model was developed separately, without reference to the system used for the staff Valuation.

Tables 15 and 16 below show the principal results of the parallel valuations. The employer cost as a percentage of covered payroll computed by EFI is very close to that computed by PERS staff.

Table 15: JRS II Parallel Valuation Results as of June 30, 2004

	JRS II Valuation	EFI Parallel Valuation	Difference
1. Present Value of Benefits for Active Members at Entry Age	$ 445,018,521	$ 455,497,476	2.35%
2. Present Value of Pay at Entry Age	1,607,022,217	1,659,093,385	3.24%
3. Normal Cost % Pay (1) ÷ (2)	27.692%	27.455%	(0.86)%
4. Present Value of Benefits for Active Members at Attained Age	$ 698,698,834	$ 711,925,439	1.89%
5. Inactive Liability at Attained Age	5,339,671	5,581,420	4.53%
6. Total Fully Projected Liability (4) + (5)	$ 704,038,505	$ 717,506,859	1.91%
7. Present Value of Future Pay	N/A	1,544,176,088	N/A
8. Present Value of Future Employee Contributions	118,173,019	123,534,087	4.54%
9. Present Value of Future Employer Normal Costs)	290,882,926	300,419,458	3.28%
10. Actuarial Accrued Liability (6) – (8) – (9)	294,982,560	293,553,314	(0.48)%
11. Assets	267,604,460	267,604,460	
12. Unfunded Accrued Liability (UAL) (10) – (11)	27,378,100	25,948,854	(5.22)%
13. Employer Normal Cost ((3) – 8%) × (16)	41,808,063	40,116,841	(4.05)%
14. Amortization of UAL*	1,136,043	1,075,907	(5.29)%
15. Total Employer Cost (13) + (14)	$ 42,944,106	$ 41,192,748	(4.08)%
16. Projected Covered Payroll	212,309,886	206,203,242	(2.88)%
17. Employer Cost as % of Covered Payroll [(15) ÷ (16)]	20.227%	19.977%	(1.24)%

* using the same methodology as used by CalPERS

Table 16: JRS II Parallel Valuation Results as of June 30, 2007

	JRS II Valuation	EFI Parallel Valuation	Difference
1. Present Value of Benefits for Active Members at Entry Age	$ 293,447,634	$ 297,327,206	1.32%
2. Present Value of Pay at Entry Age	1,062,029,373	1,086,420,065	2.30%
3. Normal Cost % Pay (1) ÷ (2)	27.631%	27.368%	(0.95)%
4. Present Value of Benefits for Active Members at Attained Age	$ 415,211,137	$ 420,958,292	1.38%
5. Inactive Liability at Attained Age	1,223,485	1,278,887	4.53%
6. Total Fully Projected Liability (4) + (5)	$ 416,434,622	$ 422,237,179	1.39%
7. Present Value of Future Pay	N/A	1,045,804,310	N/A
8. Present Value of Future Employee Contributions [8% of (7)]	80,700,930	83,664,345	3.67%
9. Present Value of Future Employer Normal Costs [((3) – 8%) × (7)]	198,030,062	202,551,379	2.28%
10. Actuarial Accrued Liability (6) – (8) – (9)	137,703,697	136,021,455	(1.22)%
11. Assets	129,152,543	129,152,543	0.00%
12. Unfunded Accrued Liability (10) – (11)	8,551,087	6,868,912	(19.67)%
13. Employer Normal Cost ((3) – 8%) × (16)	25,198,829	24,632,708	(2.25)%
14. Amortization of Unfunded Accrued Liability	278,329	227,828*	(18.14)%
15. Total Employer Cost (13) + (14)	$ 25,477,158	$ 24,860,536	(2.42)%
16. Projected Covered Payroll	128,362,432	127,182,506	(0.92)%
17. Employer Cost as % of Covered Payroll [(15) ÷ (16)]	19.848%	19.547%	(1.52)%

* using the same methodology as used by CalPERS

Other Issues

- Accounting Standards

  The JRS I System is closed to new entrants, and as members of that system retire, their replacements enter the JRS II System, causing it to grow. In order to compute a cost for the System that is a level percentage of (growing) payroll, the amortization factors take into account the increasing population and payroll for JRS II.

  This is at odds with GASB Statement 27, which states in paragraph 10(f)(3) that "the assumed payroll growth rate should not include an assumed increase in the number of active plan members; however, projected decreases in that number should be included if no new members are permitted to enter the plan".

  The impact of a change in the amortization method for JRS II would be quite small. The Plan is nearly 100% funded, and the entire amortization payment currently represents just 1% of the total employer contribution. Nonetheless, as the JRS II matures, there will be years in which the unfunded accrued liability is material, and an amortization method compliant with GASB standards should be in place.

  Our technical analysis of the Valuation Report revealed one minor issue regarding the amortization of the unfunded actuarial accrued liability. The total scheduled amortization payment for Fiscal Year 2005-2006 is listed as $278,329 in the Valuation Report. A 30-year amortization payment of the $8,471,056 UAL remaining as of June 30, 2005 would be $283,622. This is a very small difference, but nonetheless violates the Amortization Policy stated in Appendix A of the Report. The change in employer cost as a percentage of payroll reflecting this would be negligible (less than 1/100th of one percent).

- Asset Smoothing

  The method used to smooth assets for computing costs and funding ratios in the JRS II valuation is being changed. Investment gains and losses are now being spread using a 15-year factor, replacing the three-year factor currently in use. In addition, the difference between actuarial assets and market value of assets is now allowed to vary by 20%, a widening of the 10% corridor currently in place. These changes have been put in place by the CalPERS Board to attempt to stabilize employer contribution rates.

  The 15-year period being implemented for asset valuation has both merits and drawbacks. One important point is that the more years of smoothing taken into account, the more likely it is that the actuarial value of assets will remain at one end of the 80%/120% asset corridor for extended periods of time. Of course, once the actuarial value is constrained by reaching either 80% or 120% of market value, it will tend to move in parallel with market value, and there may be no asset smoothing at all.

Through simulation modeling, we have verified this observation, showing that over a 100 year period, using a 15-year smoothing period the actuarial value reaches the corridor value (the farthest possible value from the actual market value) about eight times more often as compared to using a three year smoothing period with the same corridor. Using the same model, a 15-year smoothing period with an 80%/120% corridor reaches the corridor value about 30% more often as when using a 3-year smoothing period with 90%/110% corridor. Therefore, the recent change in method does not significantly change the propensity to reach the corridor. It does, however entail reaching a corridor farther from the market value.

We have discussed this issue and the above findings with the Actuarial Office. They are aware of the issue, and consider the potential asset fluctuations at the boundaries of the corridor to be a worthwhile tradeoff for the additional smoothing of employer costs resulting from the use of the 15-year factor. We do not disagree with their point of view.

Audits of the 2004 & 2007 Annual Valuations of the Legislators' Retirement System

EFI Actuaries completed a parallel valuation and certification of the Actuarial Valuation of the Legislators' Retirement System (LRS) as of June 30, 2004 and June 30, 2007.

Principal Results

As a result of our efforts, we were able to certify that the liabilities computed in these valuations were reasonably correct and were computed in accordance with generally accepted actuarial principles. In fact, based on the assumptions and methods employed in the valuations, the liabilities independently computed by EFI were within 1% of those computed by CalPERS staff.

Review of Methods and Assumptions

The actuarial methods and assumptions used in the LRS Valuation are well within acceptable standards of actuarial practice.

Both CalPERS staff and EFI ignored the possible impact of benefit limitations under Internal Revenue Code Section 415 on liabilities and contribution rates. The effect of this Code section is almost certainly negligible. Furthermore, neither CalPERS staff nor EFI included a liability for past legislators, not in CalPERS' records, who may be eligible to repay withdrawn member contributions and receive a retirement benefit. Such liabilities are expected to be incidental, and will be recognized and funded as they emerge.

Parallel Valuation Results

The LRS valuations were performed by CalPERS staff using the Actuarial Valuation System (AVS). EFI validated the calculations by creating an *independent* actuarial model to develop the valuation results. The only data common to the two models was the participant data; the EFI model was developed separately, without reference to the one used by staff for the valuations.

Tables 17 and 18 below show the results of the calculations. We note the fully projected liabilities produced by the Valuation and by EFI are in close agreement in total.

Table 17: LRS Parallel Valuation Results as of June 30, 2004

	LRS Valuation	EFI Parallel Valuation	Difference
Fully Projected Liability for Active Members	$ 10,270,193	$ 10,784,654	5.0%
Liability for Vested Terminated Members	9,213,438	9,611,527	4.3%
Liability for Retired Members	86,447,280	83,100,917	-3.9%
Total Fully Projected Liability	$ 105,930,911	$ 103,497,098	-2.3%
Present Value of Member Contributions	0	0	0.0%
Actuarial Value of Assets	$ 141,603,105	$ 141,603,105	0.0%
Present Value of Employer Contributions	0	0	0.0%

Table 18: LRS Parallel Valuation Results as of June 30, 2007

	LRS Valuation	EFI Parallel Valuation	Difference
Fully Projected Liability for Active Members	$ 10,941,918	$ 10,971,946	0.3%
Liability for Vested Terminated Members	10,860,857	10,867,684	0.1%
Liability for Retired Members	85,633,350	85,822,153	0.2%
Total Fully Projected Liability	$ 107,436,125	$ 107,661,783	0.2%
Present Value of Member Contributions	0	0	0.0%
Actuarial Value of Assets	$ 138,984,167	$ 138,984,167	0.0%
Present Value of Employer Contributions	0	0	0.0%

Audit of the 2004 Annual Valuation of the Volunteer Firefighters' Length of Service Award System (VFLSAS)

EFI Actuaries completed a parallel valuation and certification of the Actuarial Valuation of the Volunteer Firefighters' Length of Service Award System (VFLSAS) as of June 30, 2004.

Background and Principal Results

As a result of our efforts, we were able to certify that the liabilities computed in this Valuation are reasonably correct and were computed in accordance with generally accepted actuarial principles. However, we do have some concerns about the accounting treatment of the VFLSAS. Recent Statements promulgated by the Governmental Accounting Standards Board (GASB) suggest that in the future VFLSAS liabilities and costs may have to be accounted for differently than at present.

This issue, our supporting calculations, and some additional comments are presented in more detail below. We understand that VFLSAS is no longer part of CalPERS, so the comments below are provided for documentation and informational purposes.

The VFLSAS pays a monthly stipend of up to $100 to volunteer firefighters who have been in the System for 20 or more years. The System was started in 1981 with a $200,000 simple interest loan from the State's General Fund. The loan has been repaid.

Annual valuations of the VFLSAS are completed using the unit credit method. Each year (under the unit credit method) one year's service cost (the normal cost) is computed and added to the currently determined value of all prior accumulated credits. Volunteer departments pay for these credits on behalf of their volunteer firefighters. The cost computation process is based on certain assumptions regarding the rate of investment return on System assets, forfeitures, retirement age, longevity of members, and expenses.

A firefighter, who has reached 60 and is credited with 10 or more years of service under the System, whether or not consecutive, will be awarded a lifetime award of $5 per month for each year of service up to 20 years. Service is credited to members from the time a volunteer fire department elects to be covered. The department also may choose to purchase up to eight years of prior service credit over a financing period of up to 10 years. In 2001, a $3,000 death benefit was added for all members (whether active or inactive) who have at least 10 years of service.

Participants do not make contributions to the System. It is financed entirely by contributions from participating departments and the investment return on System assets. Department contributions equal the unit credit normal cost for members plus supplemental payments for any purchased prior service credit.

The valuation date is the last day of the plan year. The normal cost is the present value of awards accrued during the plan year. (The present value is today's cost of tomorrow's benefits -- that is,

how much must be put aside today to pay for the pension beginning at age 60.) The accrued liability is calculated as the present value of all accrued awards, including the accrual earned in the current plan year.

Review of Methods and Assumptions

We have reviewed the actuarial methods and assumptions used for the June 30, 2004 VFLSAS valuation, and found them to be within acceptable standards of actuarial practice.

Actuarial assumptions used to compute System liabilities and normal costs include:

- A 7.50% annual rate of investment return, net of all expenses;
- The 1994 Group Annuity Mortality Table for males and females for mortality;
- Rates of withdrawal which vary by years of service. The assumed rate of withdrawal for the first 5 years of service is 15%; the rate for years 6 through 9 is 5%. Inactive members are assumed to remain inactive for all future years; and
- Retirement at age 60 and completion of 10 years of credited service.

If assets on hand are sufficient, a supplemental award of half of the VFLSAS award may be paid to retired participants. Because the supplemental awards are contingent on continuing maintenance of adequate actuarial reserves, each disbursement is accompanied by a statement reflecting the discretionary nature of the stipend and cautioning the recipient that its continuation is dependent on the continued finding of financial soundness for the System.

Accordingly, because the stipend may be discontinued without legal redress, the actuary is able to exclude the liability associated with a continuation of the supplemental benefit amount (beyond two years) from liability determinations for both current and future System participants. No supplemental awards were payable as of June 30, 2004.

In the past, the VFLSAS has not been accounted for as a pension plan under GASB Statements 25 and 27. The VFLSAS members are volunteers, not employees of the participating departments, and the VFLSAS benefits are not considered by the State to be pensions.

The GASB recently released Statements 43 and 45 to define generally accepted accounting principles as they apply to "Other Post-Employment Benefits." Such benefits are non-pension benefits, mainly retiree health insurance. In issuing these Statements, GASB has now extended generally accepted accounting practices to all post-employment benefits – pension in Statements 25/27 and all other benefits in Statements 43/45.

It remains true that volunteer firefighters are not employees. Therefore, it could be argued that technically none of the GASB Statements apply. However, the participating fire departments do make contributions on behalf of VFLSAS members, and they have incurred liabilities on behalf of

active and retired volunteers. Therefore, extension of accounting rules to the VFLSAS would not be completely unexpected.

Extension of GASB accounting rules to the VFLSAS would have at least two consequences. First, an annual required contribution would be computed and included in the financial statements of the participating departments.

Second, the supplementary benefit offered by the VFLSAS may generate a liability for accounting, if not for funding purposes.

Within the VFLSAS, a supplemental benefit is payable when the valuation funding ratio is at least 100% including the supplemental benefit. The supplemental benefit was not payable as of June 30, 2004. We agree with this determination; however we believe that a liability associated with the benefit could be accounted for nonetheless.

GASB 27 states that all benefits "in force at the time of the valuation" should be included, though the phrase "in force" is not defined. Similarly, GASB 45 states that the projection of benefits "should include all benefits to be provided to plan members or beneficiaries in accordance with the current substantive plan (the plan as understood by the employer and plan members) at the time of each valuation". It seems that this contingent supplemental benefit has some value, even if it is not offered currently. Therefore, it is possible that an accounting liability could be required.

Even though GASB Statements do not presently appear to apply to the VFLSAS, we recommend that developments in this area be monitored.

Parallel Valuation Results

The VFLSAS Valuation was performed using an Excel spreadsheet to compute liabilities and normal costs. EFI validated the calculations by creating an independent Excel spreadsheet to develop the valuation results. The only data common to the two spreadsheets was the participant data; the EFI spreadsheet was developed separately, without reference to the one used for the Valuation.

Table 19 below shows the results of the calculations. We note the results produced by the Valuation and by EFI are in very close agreement. Liabilities and costs are all within 5% for all benefits, and within 2.5% in total.

When the funded ratio for a plan is close to 100%, the Unfunded Accrued Liability (UAL) becomes very sensitive to small differences in Accrued Liability (AL), as evidenced in the table. Given the Plan's current funded status, a difference of about 1% of the AL causes the UAL to be off by over 6%, thus a small discrepancy becomes amplified. The difference in the unfunded accrued liability calculated by EFI versus that determined by CalPERS is thus not a material difference.

Table 19: VFLSAS Parallel Valuation Results as of June 30, 2004

	VFLSAS Valuation	EFI Parallel Valuation	Difference
Award Normal Cost	$ 122,088	$ 128,163	4.98%
Death Benefit Normal Cost	9,175	9,302	1.38%
Load for Administrative Costs	129,098	129,098	0.00%
Total Normal Cost	260,361	266,563	2.38%
Retiree Regular Liability	660,797	661,119	0.05%
Retiree Supplemental Liability	0	0	N/A
Retiree Death Benefit Liability	104,237	104,148	(0.09)%
Active Prior Service Liability	781,676	780,504	(0.15)%
Active Current Service Liability	1,695,721	1,660,808	(2.06)%
Active Death Benefit Liability	282,834	282,944	0.04%
Total Accrued Liability	$ 3,525,265	$ 3,489,523	(1.01)%
Assets	2,974,642	2,974,642	0.00%
Unfunded Accrued Liability	$ 550,623	$ 514,881	(6.49)%

Other Issues

- Receivables

  In our prior reports certifying the June 30, 1997 and June 30, 2002 actuarial valuations, EFI observed that a significant portion (over 6% in each case) of System assets were comprised of non-interest bearing contribution receivables. As of June 30, 2004, this is also the case with net receivables accounting for about 15% of net VFLSAS assets.

  If more than 10% of net System assets were held permanently in the form of non-interest bearing receivables, one would expect a lower rate of return reflecting the lack of investment earnings on these assets. If receivable contributions are not expected to decline as a percentage of the total assets to a de minimus amount as the fund grows, then EFI recommends that the lack of investment earnings on these assets be mentioned and accounted for in the interest rate assumptions.

- Breaks in Service

  An assumption that has been used for the VFLSAS valuations is that inactive participants will remain active for all future years. This is somewhat in discord with the statement in Exhibit 7 which states that "…many members have frequent breaks in their service." Thus, some new entrants to the Plan are actually rehires, and will already have prior service, thereby increasing accrued liabilities and costs much more than a true new entrant. We suggest that this be accounted for by assuming a certain percentage of inactive participants are rehired each year.

There are currently over 2,000 of these participants. Assuming for example, that 10% of them are rehired in the future would cause an increase in Accrued Liability of about $150,000 (about 4% of the total) as of June 30, 2004. This would also serve to minimize future actuarial losses as inactive participants become active again.

- Unit Credit Funding

  While the unit credit funding method seems appropriate for dollar per month benefit accruals, an alternative should be considered if the average age of participants continues to climb steadily each year. The entry age normal funding method could avoid regular unit credit normal cost increases. EFI suggests reviewing this issue at the end of each actuarial valuation period to determine whether the group's characteristics warrant a change in funding method.

  Over the period between the June 30, 1997 actuarial valuation and the June 30, 2004 actuarial valuation, the average age of non-retired participants increased from 35.6 years to 40.3 years seven years later. This increase does seem to indicate a sustained upward trend, causing unit credit costs to increase progressively.

Audit of the 2007 Annual Valuation of the 1959 Survivor Program

EFI Actuaries performed an audit of the Actuarial Valuation of the 59 Survivor Program as of June 30, 2007. The scope of this audit was a review of the Actuarial Valuation Report (the Valuation, the Report), an evaluation of actuarial methods and assumptions, and verification of several sample sets of liability calculations.

Background and Principal Results

As a result of our efforts, we are able to attest to the following.

- Overall, we found the Report to be accurate and complete, and fully compliant with generally accepted actuarial principles and with all standards of practice.
- We reviewed the actuarial methods and assumptions used for the Valuation, and find them to be reasonable and within acceptable standards of practice.
- EFI assessed the correctness of the valuation calculations by creating two *independent* valuation models to develop liabilities for the eight groups of sample members. The resulting liabilities are within acceptable tolerances.

These findings are discussed in more detail below. In addition, we offer a few suggestions for future improvements.

The 1959 Survivor program was designed to provide pre-retirement death benefits to CalPERS' members not covered by the Federal Old Age and Survivor Insurance (OASI) program. The benefit is available only to those members not covered by OASI benefits. For CalPERS State and School members, this benefit is provided by State statue to certain groups of employees; public agencies are able to contract with CalPERS for the Program. Members who are eligible for the Program are given a one-time option to elect this benefit. Five numbered benefit levels and an indexed level are available, depending on the employer and the date of hire.

The benefit is a monthly payment to the eligible surviving spouse and children. A spouse is eligible if he or she has care of eligible children or is age 62 (60 for levels 3 or higher) or older. A child is eligible if he or she is under age 22 and not married. Physically disabled children are also eligible until the disability ceases. If there are no children or spouse, dependent parents over age 62 are eligible.

Current (2008) benefit amounts are shown below.

Monthly Benefit Amounts Payable under the 1959 Survivor Program

	Level					
Coverage Tier:	1	2	3	4	5	Indexed
Spouse with two or more children; or three or more eligible children	$430	$538	$ 840	$ 2,280	$ 1,800	$1,757
Spouse with one child; or two eligible children only	$360	$450	$ 700	$ 1,900	$ 1,500	$1,172
One eligible children only; or spouse age 62 or older; or dependent parents	$180	$225	$ 350	$ 950	$ 750	$ 585

Review of Methods and Assumptions

The actuarial assumptions and methods employed in the CalPERS 1959 Survivor Program Actuarial Valuation were reviewed by EFI in order to establish that they meet acceptable standards of actuarial practice. We examined current practices to determine if any possible improvements or enhancements are appropriate.

Actuarial assumptions used to compute liabilities and normal costs include:

- A 7.75% annual rate of investment return, net of all expenses;
- CalPERS specific mortality assumptions for surviving spouses;
- No mortality is assumed for child beneficiaries;
- Miscellaneous 2% @ 55 decrements for Miscellaneous Indexed members
- Police 2% @ 50 decrements for Safety Indexed members

We have reviewed the actuarial methods and assumptions used for the valuation, and find them to be reasonable and within acceptable standards of practice.

Methodology

The audit process involved three steps:

- Collection and review of individual liability calculations for members of the program

The scope of this audit was to review several sets of sample lives, which are representative of the various populations that are part of the full valuation. We collected eight sets of sample lives, each containing 50 to 100 individuals.

- Verification of individual liability calculations for samples of program participants

  Samples of approximately 100 benefit recipients from each of the benefit levels (1 through 5 and Indexed Level) were collected, as well as two sample sets of active members (Miscellaneous and Safety) from the Indexed Level population. For each group, we also obtained the valuation liabilities and normal costs determined by CalPERS.

  For each of the eight sets of sample lives, we independently computed liabilities and normal costs under the 1959 Survivors Program, based on the assumptions and Plan provisions shown in the valuation report published by CalPERS as of June 30, 2007. We then compared these liabilities to the ones provided to us for the audit.

Independent Calculations

EFI assessed the validity of the calculations by creating two *independent* valuation models to develop liabilities for the eight groups of sample members.

Active Members in Indexed Level

We developed a separate model for active members in the Program. This model was designed to determine the present value of benefits for each member in the same manner as that employed by CalPERS, applying Miscellaneous 2%@55 decrements for Miscellaneous members and 2%@50 Police decrements for Safety members.

Table 20 below shows the results of the calculations.

Survivors in All Levels

Our Survivors model projects expected cash flows for each benefit recipient based on their benefit level and expected lifetime. These cash flows are discounted to the valuation date using the same assumptions used for the CalPERS valuation. These present values are then compared to the figures provided by CalPERS for each group.

The results produced by the PERS staff and by EFI are in very close agreement for all of the Survivors samples, deviating by at most 4.8%. In aggregate, the total present value we determined for the sample of 589 survivors was within 1% of that calculated by PERS. Table 21 below shows the results of the calculations.

Table 20: 1959 Survivors Active Sample Liability Comparison as of June 30, 2007

	Sample Active Liabilities for Indexed Level		
Sample of 49 Miscellaneous and 50 Safety Members			
	CalPERS	**EFI**	**Ratio**
Present Value of Benefits			
Miscellaneous	39,383	39,450	100.2%
Safety	37,449	37,968	101.4%
Total	76,832	77,418	100.8%
Accrued Liability			
Miscellaneous	10,343	11,034	106.7%
Safety	16,961	16,294	96.1%
Total	27,304	27,328	100.1%
Normal Cost			
Miscellaneous	4,610	4,450	96.5%
Safety	3,317	3,534	106.5%
Total	7,927	7,984	100.7%
Normal Cost per member per month			
Miscellaneous	7.84	7.57	96.5%
Safety	5.53	5.89	106.5%
Total	6.67	6.72	100.7%

Table 21: 1959 Survivors Sample Liability Comparison as of June 30, 2007

		Sample Survivors Present Value of Benefits		
Level:	Number in Sample	**CalPERS**	**EFI**	**Ratio**
1	100	1,708,422	1,750,543	102.5%
2	89	1,948,414	1,968,529	101.0%
3	100	3,283,353	3,271,206	99.6%
4	100	9,605,676	9,881,178	102.9%
5	100	7,168,902	7,511,036	104.8%
Indexed	100	8,874,843	8,502,508	95.8%
Total	**589**	**32,589,610**	**32,885,000**	**100.9%**

Reconciliation of Results

For all six of the survivor samples, EFI's calculations were within 5% of those computed by CalPERS, therefore no reconciliation is required. The same is true for the total present value of benefits and normal costs for the two active samples.

The total present value of benefits, accrued liability, and normal cost computed by EFI were all within 1% for the combined sample of 99 active lives. There were some differences slightly greater than 5% for two components of the calculations: normal cost for the Miscellaneous sample, and accrued liability for the Safety sample. We believe that these discrepancies are due to minor differences in the valuation models, and thus do not represent material deviations.

Other Issues

- Member Data

  We did not audit the participant data nor did we audit the asset information that was provided to us. The only element of the data that we found to be a potential issue was that some of the payment amounts listed for the survivor samples did not seem to match their benefit level and coverage tier.

- Actuarial assumptions

  We have reviewed the actuarial methods and assumptions used for the valuation, and find them to be reasonable and within acceptable standards of practice.

  With respect to the computation of liabilities and cost for active members in the Indexed Level, a "claims matrix" is used to estimate the present value of future payments to survivors. While this is a reasonable approach, we suggest investigating alternative methods of estimating the present value of survivor benefits at the time of death, such as a full projection of expected cash flows or expected claims based on weighted distributions of surviving spouses, children, and dependent parents.

- Valuation Report

  Overall, we found the report to be accurate and complete; however, we would like to make one suggestion: In the plan provision section of the report, the "start and stop" nature of survivor benefits should be described in more detail. For example, a spouse with dependent children will receive payments from the Plan until the children are older than age 22, and then will receive payments again upon attainment of age 62.